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(foreground) exhibits a stage of erosion after the synclinal mountains have been removed, and replaced by resequent synclinal valleys; while the anticlinal subsequent valleys of the second stage are here replaced by resequent anticlinal ridges.

Fig. 10. A serrated monoclinal ridge of Witteberg sandstone, near Buffels river gorge, looking southwest. The structural location of this ridge is indicated at *D*, Fig. 2.

Fig. 11. Drakenstein ridge, inland from Cape Town, looking northeast.

Fig. 12. Diagram of anticlinal, synclinal and monoclinal ridges, formed by extensive erosion of folded strata, the axes of the folds pitching gently to the right.

Fig. 13. Outline map of South Africa. Nearly all the localities mentioned in the text are here indicated.

GEOGRAPHICAL RECORD.

AFRICA.

Determining Longitudes in Africa by Telegraph.—Captain R. Ommanney, R. E., and Captain G. F. Evans, R. E., returned to England at the end of June on completion of the telegraphic longitude work for which they were sent to North Nigeria last autumn. Starting at Lagos in the middle of November, 1905, the expedition worked up the telegraphic line *via* Jebba and Lokoja, and then along the line which goes through Zunguru and Zaria to Kano. Working eastwards, Leri and Bauchi were fixed, and on the return journey the telegraph line along the River Benue was used to determine the positions of Ibi, Keffi, and Loko. In all, the longitudes of fifteen important towns in Nigeria were determined with reference to Lagos, the longitude of which had already been fixed by cable from Cape Town. The mission involved a march of about 2,000 miles, and much arduous work.—*Scott. Geog. Mag.*, No. 8, 1906.

Ruwenzori and the Sources of the Nile.—In the paper which Mr. Douglass W. Freshfield read before the Alpine Club on his journey to Ruwenzori (*Alpine Journal,* No. 173) he said that if he were to go again to this Central African range, he should make every effort to get to the top soon after dawn, before the clouds concealed the view of the Nile sources. He thinks this view would be unique, with both Victoria and Albert Nyanza in sight and embracing practically the whole region of the Nile sources. It is probable that Ruwenzori may be frequently visited in the coming years. The Nile route to Uganda already opened will very soon be greatly improved and quickened, and before long travellers will go down the Red Sea and return by the Nile. Ruwenzori is a fortnight's march from Lake Victoria and about a week's from Lake Albert. A four months' winter tour may suffice for the round, including a visit to the mountain.

The Natal Government Museum.—Natal has just issued its first Report (for 1904) of the Museum at Pietermaritzburg. The volume of 185 pp. is illustrated with half-tones of the fine Museum building erected in 1902-03 and of some of the exhibition rooms. The Ethnological Department promises to be especially important. Many valuable specimens of native workmanship have already been procured; and it is time, for the native population is being profoundly modified by its contact with the white man, and the use of many of the things they have manufactured for generations will soon completely die out. The catalogue of the exhibits fills 146 pages. In a country where mining and agriculture are foremost, much attention has naturally been given to collections illustrating these occupations. Besides this institution the principal museums in South Africa are the Chamber of Mines Museum in Johannesburg, the Museum and Zoological Gardens and the Geological Survey Museum in Pretoria, the Orange River Colony Museum at Bloemfontein, the Cape Museum and the Marine Laboratory at Cape Town, and the Museums at Grahamston and Port Elizabeth.

DISTRIBUTION OF VILLAGES NEAR TANGIER.—In his book "Explorations au Maroc," Mr. Louis Gentil says that soon after leaving Tangier on his way to Tetuan he observed that the villages were invariably ranged along the base of high sandstone cliffs. As the distribution of the water sources probably accounted for the position of the villages, he investigated the matter, and found that the Eocene sandstones at their contact with the Cretaceous clays formed a remarkable water horizon, whose points of emergence might thus be determined by the stratigraphy. A geological map of the region, well made and sufficiently detailed, would thus have prime importance from the hydrological point of view. Nearer Tetuan he observed another illustration of the same sort, where at the contact of the secondary and primary rocks water is found and the houses are therefore ranged along this line of meeting.

CLIMATE AND RAILROAD CARS IN AFRICA.—In a recent address before the Royal Meteorological Society of London, Dr. H. R. Mill, describing a visit to South Africa during the British Association meeting last year, called attention to the way in which the cars on the Uganda Railway are adapted to meet the peculiar conditions of the region. In order to defy wood-loving insects, the cars are built of metal. They have very deep ventilators, protected by wire gauze against mosquitoes. The windows are provided with green-tinted glasses, to enable the passengers to see the landscape and at the same time have protection against the merciless glare of the sun. R. DE C. W.

GLACIAL PHENOMENA IN GRIQUALAND WEST.—Messrs. R. B. Young and J. P. Johnson describe in the *Transactions* of the Geological Society of South Africa (Vol. 9, pp. 34-39) the glacial phenomena of Dwyka age which they had many opportunities of observing during a recent journey through Griqualand West. The glaciated surfaces occasionally consist largely of beautiful *roches moutonnées,* rising above the general level, but more frequently the surfaces are flat or only gently curved. All of them exhibit glacial markings, excepting the exposure at Blaauwbanksfontein, where, even at the junction of the rocks and the overlying moraine, none of the usual markings is observed. Well-marked glacial grooves frequently occur and testify to the erosive action of the ice-sheet. Two of these are seen on a *roche moutonnée* of diabase which is shown in the illustrations. The striæ are generally very well preserved. Long lines of "chatter marks" are very common, the graving tool in these cases having been a boulder or pebble held in the unsteady grip of the ice. The glacial markings go to prove that the general trend of the ice movement was from the northeast to the southwest. The covering of moraine varies locally in thickness, but there is a well-marked thickening from the northeast to the southwest. At Riverton and in the sections exposed in the mines at Kimberley the thickness varies from about 10 feet to *nil*. The glaciated surfaces examined were along the western fringe of the Karroo system, following, more or less, the course of the Vaal River and of the Orange River after its confluence with the Vaal as far south as Prieska. These surfaces early attracted the attention of the Bushmen who once inhabited this region, and they covered some of them with carvings or chippings representing deer, the lion, the rhinoceros, the boar, and other animals. Many of these carvings are of considerable age, and testify to the resistance to weathering of the glaciated surfaces.

THE NEW RAILWAY IN THE CONGO STATE.—The railway, 75 miles in length, between Stanleyville and Ponthierville, on the upper Congo, has been completed. It circumvents the stretch of rapids that form the first impediment to navigation on the upper river. Its southern terminus at the head of the rapids is in straight lines, about 1,070 miles from Zanzibar and 970 miles from the mouth of the Congo. The purpose of the Congo State is to carry railways around the few parts of the river which are obstructed by rapids, so as to extend unbroken steam transportation to the end of the farthest navigable reach of the Lualaba River, the head branch of the Congo. The railway just completed has added 261 miles of steam transportation to the 1,325 miles already in operation between the Congo mouth and Stanley Falls. Navigation is again impeded at Kindu, 186 miles above Ponthierville, and the Government will build a stretch of railway from Kindu to Buli, about 180 miles, above which there is navigation for 372 miles, where the importance for commerce of the Congo and its Lualaba extension practically ends. The total length of steam transportation along the Congo, when the last mile of rails shall have been laid, will be about 2,144 miles, of which 1,548 miles will be by water and 596 miles by land. The end of the long route will then be in touch with the great mining region of Katanga, which needs transportation for the development of its copper and gold resources.

AMERICA.

NEW YORK STATE RED BOOK FOR 1906.—The issue of the annual, with 360 pages, is larger than heretofore on account of many changes in the Highway Law last winter and the need to give ample space to directions, and information for the guidance of road officials. The improvement and maintenance of over 74,000 miles of public highway in this State are of vital importance, and it is certainly desirable to assure fulness and clearness in the road book. First-class roads are defined as the main travelled roads of the county leading to or connecting the principal centres of population. State Engineer Van Alstyne writes that these roads should have their grades reduced, their drainage made as perfect as possible, and their surfaces covered with macadam, gravel, or other suitable material of sufficient thickness to prevent much injury to the road surface. Second-class roads comprise all that are not designated as first-class roads. The sections of the law relating to the repair and maintenance of both classes are quoted. One hundred and twenty pages give the road improvement statistics for 1905 of every town in the State. A number of full-page pictures from photographs are very instructive. Some of them show highways before and after the grade is reduced and roads that are not properly repaired. In one case State aid was withheld because the Highway Commissioner did not remove loose stones, and in another instance because stones, sod, and organic matter, instead of being removed, were scraped to the centre of the road, forcing travel to its sides.

NAVIGATION OF HUDSON STRAIT.—A favourable report regarding the navigation of Hudson Strait was recently received by the Mounted Police Department of Canada. Major Moody, commanding a police expedition, reported that navigation was not closed last year until November 23, and this year navigation opened on June 28. It is expected that with specially-built vessels the navigation of the Bay and Strait will be possible for over four months.

REVIVAL OF MINING IN NEVADA.—Long ago the gold and silver pouring out from the Comstock, Eureka, and Tuscarora mines made the State of Nevada famous. After a sleep of thirty years, she has once more opened her wonderful treasure vaults. Tonopah, Goldfield, Searchlight, and other camps have vindicated the reputation of the desert State and impressed the world by their production. No longer is the geologist under the necessity of confining himself to obituary notices of decadent camps. Tonopah, for one, is very much alive, and the report on its geology and mineral resources by Mr. Spurr (*Prof. Paper* No. 42, U. S. Geol. Sur.) is a timely publication, which will be read with much interest by mining engineers and geologists (*Economic Geology,* Vol. 1, No. 7, 1906).

The Tonopah mining district was discovered by a prospector named James L. Butler in 1900. He found ledges of white quartz and took specimens to an assayer, who was so little impressed with the samples that he threw them into his waste-pile. On his return journey Butler broke off more samples from the same ledge, and another assayer reported values of $50 to $600 per ton in silver and gold. Ore worth over $4,000,000 was extracted before the end of 1901, but the companies owning the mines later gave much more attention to development work than to mining.

GEOLOGY AND UNDERGROUND WATER RESOURCES OF NORTHERN LOUISIANA AND SOUTHERN ARKANSAS.—The U. S. Geological Survey prints this comprehensive report by Mr. A. C. Veatch as "Professional Paper" No. 46. The work is divided into six sections, of which the first discusses the geological history and topographic development of the region, and treats in detail of the manner in which this part of the coastal plain was formed and of the broad geological facts on which the conclusions reached in the succeeding chapters are based. The second chapter states the fundamental principles governing underground waters and applies them to this region. Methods and cost of well-making are discussed in the third, and the underground conditions in each county are described in the fourth section. The fifth section is an alphabetical arrangement of all the well data collected up to this time, and the report concludes with a Dictionary of Altitudes, arranged by counties, and based on precise levels.

ANNUAL REPORT OF THE GEOLOGICAL SURVEY OF CANADA FOR 1901.—This volume, only recently issued, contains a considerable number of reports of later date. The report on the Klondike gold fields by R. G. McConnell is based on field work carried out in 1903. Among the other reports are papers describing the survey of the Ekwan River and of the route through Sutton Mill Lakes northward by D. B. Dowling; a long description of the nickel and copper deposits of Sudbury by Alfred E. Barlow, which brings together all the more valuable and critical investigations concerning these apparently inexhaustible deposits; and a description of the Pictou coal field, Nova Scotia, by Henry S. Poole.

FUTURE OF WESTERN CANADA.—Mr. E. B. Osborn read a paper with this title before the Royal Colonial Institute, London, some months ago, in which he said (*Proceedings,* Vol. 37) that great areas of the best farm lands in Manitoba do not yet send a bushel of wheat to the market because it cannot be grown profitably, the nearest railway being too distant. Only 9.70 per cent. of the acreage of Manitoba is at present cultivated. Still, Manitoba is the only one of these western Provinces that can be said to have a fairly adequate railway system. Saskatchewan and Alberta really do not yet possess railway systems at all. Only 0.47 per cent. of Saskatchewan and Alberta (excluding Athabasca, which is now divided between them) is as yet under the plough; but the proportion of good to bad land is as high in those Provinces as in Manitoba. At present the single-line transcontinental road of the Canadian Pacific, with some help from the Canadian Northern, has to do all the work of transportation. When the Canadian Northern is finished and the Grand Trunk Pacific is completed (1911), the area where wheat may be profitably grown will be vastly increased. The speaker was of the opinion that in twelve or fifteen years the Canadian West would provide Great Britain with all the wheat she required.

CANADIAN YEAR BOOK FOR 1906.—The ninth volume of this useful annual, prepared for the current year, has just been printed. Among the features of the book are the tariff schedules of Canada, an alphabetical list of post offices, a long list of dates and events connected with the discovery and history of Canada, and statistical and official data for each of the provinces.

INTERNATIONAL CONGRESS OF AMERICANISTS.—The fifteenth meeting of this body was held at Quebec, Sept. 10 to Sept. 15. The papers presented were of much value, though the attendance was not large. A distinctive feature was the presence of many missionaries from all parts of Canada, who contributed reports on the tribes among whom they are living. South America and Central America were not so fully represented as usual. Delegates were present from Germany, England, Mexico, the United States, and some other countries.

The first meeting was given to the subject of the French in Canada and to historical papers, among the contributions being unpublished documents presented by Abbé Gosselin relating to the Indians of Louisiana, and the following papers: by Prof. E. L. Stevenson on a Hondius map recently discovered by Father Fischer; by Dr. Berthold Laufer on the history of the introduction of maize into eastern Asia; by M. de Villiers du Terrage on the history of Louisiana; and two papers, by Mr. Rivard of Quebec and Prof. A. F. Chamberlain of Worcester, on the Canadian French dialect.

The programme of Tuesday included subjects relating to Mexico and Central America and papers on the Tinné and Athabascan tribes of Alaska and the aboriginal languages of northern California. The principal papers on Wednesday dealt chiefly with the practical efforts to keep alive and to revive Indian art, and Miss Curtis demonstrated the beauties of Indian music by rendering a number of Indian songs.

Thursday was given to a number of papers on the Indian tribes of North America, and a discussion by Dr. A. Hrdlicka of those remains of man that are believed to prove his antiquity on this continent. The conclusions reached were negative, so far as the anatomical differences between these remains and the present types of Indians are concerned. The Friday sessions were devoted to illustrated papers on Mexico and Central America, and to interesting studies of the languages, proper names, etc., of some of the United States Indian tribes. About fifty papers were read by their authors and a considerable number by title in the absence of the authors. Vienna was chosen as the place for the meeting of the next Congress in 1908. Among the prominent scholars present in addition to those named above were Professor Paul Ehrenreich of Germany, Dr. Tozzer, Dr. Haddon, Dr. McIver of Great Britain, and Dr. Boas, Father Morice, Dr. Peabody, Dr. Walter Hough, and Dr. Robert Bell of America.

THE TEHUANTEPEC RAILWAY.—This railway was practically completed over a year ago, and during the past summer the final touches were given to its terminal ports, Coatzacoalcos and Salina Cruz. Next year this Isthmian route is expected to take rank as one of the world's great trade highways. The terminal harbours will be opened for inter-oceanic traffic in December, when the American-Hawaiian line will begin regular service with two fleets between San Francisco, Hawaii, and Salina Cruz on the Pacific and between New York and Coatzacoalcos on the Atlantic. The fleet of the company on this route will have a dead-weight carrying capacity of 108,000 tons. All the steamship lines now running between Europe and Mexico will introduce regular service to Coatzacoalcos, and steamship connections will be established at Salina Cruz with all the Pacific coast ports of Central and South America as far south as Valparaiso. The railway bids fair to increase the prosperity of Mexico, and it will be a boon to international commerce.

SOUTH AMERICAN METEOROLOGY.—It is seldom that meteorological notes are obtainable from much of the interior of tropical South America, and all such contributions are welcome. During a trip made in 1903, Professor Solon I. Bailey, well-known in connection with his establishment of the meteorological station on the Misti (19,200 ft.), followed "A New American Route to the Plain of the Amazon" (*Nat. Geogr. Mag.*, Aug., 1906). Crossing the Andes from west to east, and reaching the eastern crest, we note that "here all the moisture from the wet air, borne by the trade winds across Brazil from the distant Atlantic, is wrung by the mountain barrier and falls in almost continual rain." This is an extremely interesting statement concerning the actual conditions of these trade-wind rains, which are indicated on the rainfall maps of the world and which occur a long distance inland from the ocean on the east because their opportunity does not come until the mountain barrier forces the winds to rise. "Near the summit of the pass only the lowest and scantiest forms of vegetable life are seen. In a single day, however, even by the slow march of weary mules, in many places literally stepping downstairs from stone to stone, we drop 7,000 ft. Here the forest begins, first in stunted growths, and then, a little lower down, in all the luxuriance of the tropics, where moisture never fails. The lower eastern foothills of the Andes are more heavily watered and more densely overgrown than the great plain farther down. Here is a land drenched in rain and reeking with mists, where the bright sun is a surprise and a joy in spite of its heat." The contrast between a trade-wind desert, like the Sahara, and a region of abundant precipitation, like that here described, is chiefly a question of mountain barriers in the path of the prevailing winds.

R. DeC. W.

THE EARTHQUAKE IN SOUTH AMERICA.—Between 7 and 8 o'clock on Thursday evening, Aug. 16, Valparaiso and other coast towns of Chile were visited by a very severe earthquake, causing widespread damage and involving the death of about 1,000 persons. Two distinct shocks were followed, as is usual, by fire, which greatly added to the material loss. The disturbance extended eastward into the Andes, and the coast towns were affected to a greater or less extent as far north as Arica and as far south as Concepcion, a distance of about 1,250 statute miles. The shock at Santiago, the capital of Chile, was very severe, lasted three and a half minutes, and was followed by a heavy shower. The damage at Valparaiso was, however, much greater than at Santiago, and many buildings in one of the best residential sections situated on the lower and softer land between the hills and the bay were destroyed. Seismographs in Europe and other parts of the world plainly indicated the disturbance. It is reported that the cause of the earthquake, as in the recent California disaster, was rebreakage along an old fault-line, extending north and south between the Cordilleras and the coast. Much of the information concerning the great catastrophe has thus far been of a conflicting nature, and an adequate report cannot be expected until the occurrence has been carefully studied.

It is probable, however, that this great earthquake will not receive the thorough study that is being given to the preceding California shocks. So far as we have heard, no important sea wave, resulting from the earthquake, was observed along the South American coast, though such waves were recorded on the coasts of the Hawaiian Islands. The waves reported there varied in height from a few inches to five feet at Hilo and 12 feet in the enclosed Bay of Maalea. The time when these waves were observed shows that they must have been produced by this earthquake.

SUBMARINE GOLD FIELDS.—The *Diario Oficial* (May 16, 1906) of Colombia publishes the contract between the Colombian Government and Mr. Allen Webster, by which the latter is authorized to exploit gold-bearing areas beneath the waters of the Atlantic and Pacific coasts of the Republic for a period of twenty-five years.

MARINE METEOROLOGICAL SERVICE OF CHILE.—The sixth volume issued by the *Servicio Meteorológico de la Dirección del Territorio Marítimo* of Chile, containing data for 1904, continues the valuable reports of a meteorological service whose work is but little known in the scientific world at large. A new station has been in operation at Punta Arenas since Jan. 1, 1905. Some noteworthy diagrams of the various meteorological elements are given for several stations, and also a comparative diagram for the years 1903 and 1904. The stations contributing to this volume are all situated on or just off the Chilean coast. R. DeC. W.

ASIA.

THE FRENCH INDO-CHINESE RAILWAY.—The *Board of Trade Journal* (No. 503) describes the journey recently made by Mr. T. F. Carlisle, British Consul at Hanoi, between Hanoi and Yunnan-fu. The railway from Yenbay to Laokay was opened in February last, so that the frontier of Yunnan is now in railway communication with Haiphong, the port of Tonkin. Mr. Carlisle followed the route of the Indo-Chinese railway all the way to Yunnan-fu. It is expected that the line will be completed for traffic in three or four years. The impression his journey made was that the country contiguous to the line is poor, but that considerable population and resources are within easy reach on both sides and will provide an important amount of railroad business. The advantage to traffic will be that goods may be taken by rail from Haiphong to Yunnan-fu in two or three days, and thus avoid the cost and risks of the long journey overland or by the Red River.

THE STUDY OF CHINESE.—Dr. Friedrich Hirth of Columbia University, the well-known Sinologist, recently expressed his views in a communication to the *Evening Post* of New York on the study of the Chinese language. During his many years in China be observed that most foreign students, when left to themselves, do not succeed in grasping the essential points in learning either to speak or read Chinese. If anything can be acquired on the spot it is the spoken language, and far more persons are fairly successful in this than in the reading of a book or a document. The difficulties of the language have to be explained by a foreign, not by a native teacher. Men who wish to make a career in China will find the desirable facilities for instruction in the Chinese language and literature in institutions like Columbia, Yale, and Berkeley, in the United States, or Oxford, Cambridge, London, Liverpool, Berlin, Paris, Lyons, etc., in Europe.

We should imitate the Japanese system in studying Chinese. The Japanese lay the main stress of their young men's studies on the written language—by far the most difficult part of the work before them—and they let the spoken language take care of itself later as opportunities may offer. Western foreigners, unfortunately, usually adopt the opposite course. Student interpreters go to Peking knowing next to nothing about China and its language, and by freely mixing with the population sometimes acquire a wonderful command of the spoken idiom. They are much surprised when called upon later to translate a document to find that they are unable to make sense of the hieroglyphics before them. A first-class interpreter should be able to translate documents and books without the aid of a native; and this is the advantage which the Japanese have over us. Our students should first spend a number of years in University study in order to become thoroughly initiated in the mysteries of the book language, and it will be time enough to attend to the spoken language when they begin to live in China.

AUSTRALASIA.

WESTERN AUSTRALIA YEAR BOOK, 1902-4.—The thirteenth edition of this handbook will be very useful to all who wish to keep pace with the development of the State. It contains nearly 1,300 pages, deals with all parts of the country and all topics of public interest, and has many maps and half-tone illustrations. One of the pictures shows the Mundaring Weir, the highest overflow weir in the world, with a capacity of 4,600,000,000 gallons and a daily output capacity throughout the year of 5,000,000 gallons. This is the great water scheme, now officially known as the Goldfields Water Supply, which was completed in 1903 at a cost of $13,000,000, and supplies water to the gold fields of Coolgardie and neighbouring mining centres and to settlements and areas between the mines and the west coast mountains. The water is pumped from the reservoir, some twenty miles south of Perth, for a distance of 351 miles. There are twelve smaller reservoirs and receiving tanks, and the mining towns and districts are supplied from the final reservoir, which is about 1,200 feet higher than the initial reservoir at Mundaring. The water is raised by pumping installations at eight stations along the principal main, which is 30 inches in diameter.

DIVERSITY OF TONGUES IN NEW GUINEA.—Mr. A. E. Pratt, the naturalist, telling the story of his sojourn among the aborigines of Southern New Guinea in his new book "Two Years among New Guinea Cannibals," says that language is curiously diversified among them. The explorer meets a tribe with a distinct speech, and, camping near them for a time, he learns the common currency of their tongue. A few miles farther on appears another people, perhaps not greatly differing in type, but with another language altogether. Thus at Dinawa, where Mr. Pratt's party were encamped for five months in the foothills of the Owen Stanley Range, the native phrase for "Build the fire" was "Aloba di"; while at Foula, only eighteen miles as the crow flies but much farther on foot, the phrase runs "Aukida pute." He says that the main reason for this linguistic variation is to be found in the fact that travel in the Papuan Highlands is extraordinarily toilsome, owing to the exceeding abruptness of the topography and the endless succession of almost razor-like ridges. Long, rough ascents and descents and devious windings are the portion of the wayfarer who wishes to reach some spot that may even be visible from his last halting-place. Thus the tribes are confined to narrow areas.

EUROPE.

GROUPS OF HABITATIONS IN THE VAL D'ANNIVIERS.—MM. Jean Brunhes and Paul Girardin, Professors of Geography in the University of Freiburg, have a suggestive article (*Annales de Géog.*, No. 82) on the groups of dwellings in this valley and their inhabitants. It is a study on the effect of geographic environment upon human activity. The peasants living here number 2,300. Their home is this narrow Swiss valley leading down from the glacier of the Dent Blanche to the Rhône River. It is only 13 miles long, and in that distance it rises 6,500 feet. Here and there in the narrow valley are patches of arable ground, areas of pasture land, and meadows yielding good crops of hay. The distinguishing fact regarding the inhabitants is that all accompany the herds and flocks wherever they are taken, except to the very highest pastures, to which the shepherds alone resort. There are groups of habitations wherever there is land to till, hay to cut, or grazing for the live stock, and each group of buildings is empty whenever work calls the occupants to some other part of the valley. At any season, entire families may be seen either ascending or descending with their herds and household utensils, as though they were quitting the country. It is not, however, an emigration, but merely one of the periodical migrations of the Anniviards.

They divide the year along the 13 miles of the valley in this manner. In December and January they are grouped with their herds in the lower pastures. In February they live in their villages, where the largest amount of hay is stored. They travel down the valley in March to attend to their vineyards near the Rhône. In April they are back again planting the fields and gardens around their villages. In May and the early part of June they are again gathered at the lower pastures. From the middle of June nearly to October the people are divided into two groups—a small group of men tending the live stock, at the various Alpine pastures, and the others dividing their time between the vineyards and the cultivation and harvesting of the crops around their villages. All descend to the Rhône in late October and early November to harvest the grapes and make wine, and then they return to the lower pastures again.

This strange manner of life simply responds to the economic necessities of the people. The peasants are increasing in number, and must utilize every acre of their cultivated hay and grazing lands. The productive elements of the soil would soon be exhausted if the land were not richly fertilized, and so they must needs move their live stock from place to place at frequent intervals.

They prefer to have homes wherever their labours require them to remain a few weeks. Thus each family has four or five dwelling-places, and to one or another of them they are continually removing their modest household equipment.

POLAR.

THE ANGLO-AMERICAN POLAR EXPEDITION.—A little later information has been received from the Mikkelsen-Leffingwell party than that appearing in the September BULLETIN (pp. 567-68). The expedition on Sept. 4 was in Elson Bay, about ten miles east of Point Barrow, waiting in its sailing vessel, the *Duchess of Bedford,* together with a whaling fleet of about a dozen vessels, for the ice to move off the coast sufficiently to allow of a passage eastward. The channel was reported to be badly blocked for about 100 miles to the east, where good, open water, it was thought, might be found to Cape Bathurst, and possibly to Prince Albert Land, where it was intended to make winter quarters for the first season. The party had heard that their ethnologist, Mr. Stefansson, who had descended the Mackenzie River, was waiting for them at Herschel Island. All the members were in good health, and reported that their vessel was a very satisfactory sea-going craft. It is believed that she will stand the ice well. On the way up to Point Barrow they were able to purchase dogs at St. Lawrence Island, and accordingly did not cross over to Siberia for them.

Large game was reported as being scarce, but ducks were in great abundance. The *Duchess of Bedford* was the first sailing vessel which found its way through the ice to Point Barrow. If the expedition does not get as far east this season as anticipated, there is plenty of work to do, and the party will endeavour to make the most of their time and opportunity. In that event Mr. Mikkelsen plans a sledge journey to ascertain if the rumoured island "Keenan Land" exists to the north of Point Barrow, as whalers have reported; and Mr. Leffingwell will engage in geological investigations in the western area, where such studies have not been made. It is intimated that if the base of their proposed work cannot be reached this season the party may spend an additional year in the Arctic, provided they can obtain sufficient supplies.

THE INTERNATIONAL POLAR CONGRESS AT BRUSSELS.—Sixteen countries were represented at the First International Polar Congress which met at Brussels on Sept. 7-11, this year. Among the explorers, geographers, and others present were Dr. von Drygalski of the German Antarctic Expedition, Dr. O. Nordenskiöld of the Swedish Antarctic Expedition, MM. de Gerlache, Arctowski, Dobrowolski and Lecointe of the *Belgica,* and Paul Reclus, Dr. Hugh R. Mill, Prince Roland

Bonaparte, Dr. Charcot, Charles Rabot, Herbert L. Bridgman, and others. A committee, consisting of nineteen polar explorers and nine other members, was appointed to formulate the constitution of an International Polar Association. This Committee, afer prolonged sessions, submitted the constitution which was adopted by the Congress. Its provisions are thus summed up (*Scot. Geog. Mag.*, Oct., 1906):

> The Association desires to establish closer relations in scientific matters between polar explorers; to attempt, as far as possible, to co-ordinate observations in polar regions; to discuss the results of polar expeditions; to support, when asked, any undertaking the objects of which are the scientific study of polar regions, especially in pointing out what most requires attention; but the Association will not actually direct or patronize any definite expedition. All nations who have taken any part in polar exploration are to send two ordinary and two extraordinary members, to be elected by the Government or the learned societies of their country.
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> The representatives are to be preferably polar explorers, and, when possible, one Arctic and the other Antarctic; they are to be elected for six years. Corresponding members can also be elected from among men who have written on scientific matters relating to polar regions. It is probable that the Association will hold a meeting every three years.

Resolutions were adopted to the effect that the Congress considered it advisable to elaborate a scheme for methodical exploration of the polar regions; expressing the admiration of the Congress for the important geographical and geological work carried out in Greenland under the patronage of the Danish Government, and congratulating that Government upon the establishment of the new biological laboratory at Disco; in favour of permanent observatories in countries abutting on polar regions for meteorological and magnetic observations; also in favour of at least three fixed seismological observatories in the polar regions.

THE AMUNDSEN EXPEDITION.—The Associated Press sent the news on Sept. 3rd that Captain Amundsen had arrived at Nome, Alaska, with his expedition, on board the Gjöa. This little vessel has, therefore, completed the northwest passage which was practically accomplished by the Gjöa in September last when she reached King Point, a little west of the Mackenzie delta, where she was frozen in for the winter. Captain Amundsen may not himself return to Europe on his vessel, but he apparently intends to carry out his original purpose, which was, if he succeeded in making the northwest passage, to send the Gjöa home *via* San Francisco and Cape Horn.

VARIOUS.

GEOGRAPHISCHES JAHRBUCH.—The second part of the volume for 1905 has just appeared from the Perthes establishment, Gotha. Dr. Adolf Marcuse of Berlin has prepared the report on the progress of geographical surveying; the preceding review of this subject appeared in the volume of 1902, and was written by Professor E. Hammer. Professor R. Langenbeck of Strassburg sums up the new literature relating to the physics and mechanics of the globe; Professor K. Schering enumerates the many writings of the past five years on terrestrial magnetism; the report on the progress of botanical geography, by Prof. O. Drude, covers the period of 1901-4; Dr. Gähtgens of Strassburg reports on ethnological exploration, which review had been in charge of Prof. Georg Gerland since 1876; Prof. E. Oberhummer of Vienna makes a valuable contribution to historical geography in his report upon the knowledge of lands and peoples of the ancient world; and Dr. Hermann Wagner concludes the book with a list of the representatives of geography in the higher schools of Europe and other countries—a list not entirely accurate for the United States, as Yale University does not appear, and Prof. Goode is assigned to Columbia University instead of the University of Chicago. The literature of terrestrial magnetism for the five years included in Prof. Schering's report is so voluminous that merely the titles of many works are given. A list of all the magnetic observatories, with their latitude, longitude, and magnetic elements, is given. Volumes 5 and 6 of the ten volumes of the scientific results of the German South Polar Expedition (1901-3) will contain the magnetic work.

PROFESSOR GOODE'S SUN BOARD.—Professor Goode of the University of Chicago has devised a small instrument called a Sun Board, which is intended for teachers and classes in geography, meteorology, and astronomy, in their study of the sun as the source of heat in climate. The instrument is substantially made, easily manipulated, and solves a number of important problems with approximate accuracy. It is especially adapted for laboratory work. Among the questions which it helps the observer to answer are the determination of the horizontal plane, the cardinal points, the sun's altitude and azimuth, the latitude of the observer and the area covered by a sunbeam of given size, so that the heating efficiency of the sun at any altitude may be determined; in other words, the observer is able to ascertain quantitatively the intensity of solar radiation, not only from day to day, but for different hours of the same day. The instrument is so simple that it is to be commended even to teachers of the lower grades. It is already rendering good service in a considerable number of schools.

CLOUDINESS AND THE LOCATION OF ASTRONOMICAL OBSERVATORIES.—In an address before the American Philosophical Society at the Franklin Bi-Centennial Meeting ("An International Southern Telescope," Proc. Amer. Philos. Soc., XLV, 1906, 44-53), Professor E. C. Pickering brought out the noteworthy fact that nearly all of the principal observatories are situated in places which are especially unsuited to astronomical work. If the earth be divided into cloudy and clear halves, nine-tenths of the observatories are in the cloudy region. The three extensive clear regions of the world present these conditions: In the interior of Northern Africa there is no large observatory; in South Africa the only large observatory is at Cape Town, which is in an exceptionally cloudy part of that region; and in Australia the two principal observatories are on the cloudy coast, not in the clear interior. The South African clear area probably offers exceptionally good conditions for astronomical work, but whether better than those at Arequipa, Peru, where the Southern Station of the Harvard Observatory is located, remains to be seen. Sir David Gill, Director of the Cape Observatory, has recommended Bloemfontein. R. DEC. W.

PRESSURE CHANGES IN A NINETEEN-YEAR PERIOD.—Dr. W. J. Lockyer contributes to a recent number of *Nature* (Vol. 74, 1906, 352-354) an abstract of a paper read by him before the Royal Society on June 21 last, under the title *Atmospheric Pressure Changes of Long Duration.* It appears that in Australia the pressure curves show principal maxima nineteen years apart. The same thing is found in South America, while the conditions in India are somewhat different, there being a variation of an oscillatory nature, the maxima or minima coming about every ten or eleven years. The Indian pressure curves in general resemble the inverted curve representing solar activity as deduced from the area of sunspots. As the Australian curves are allied to the Indian variations, but are of a modified form, Dr. Lockyer thinks it possible that the modification may be due to some terrestrial cause. It may be recalled that Mr. H. C. Russell has brought forward evidence of a nineteen-year cycle in Australian weather.

R. DEC. W.

The Royal Geographical Society has issued through Mr. E. Stanford a general index to the first twenty volumes of the *Geographical Journal,* 1893-1902. The work is divided into three parts, devoted respectively to papers, maps and general subjects. The geographical field is so well covered by this publication that the index of the first ten years cannot fail to be a very convenient and helpful reference work for geographers.

The University of Greifswald, on the occasion of the celebration of its four hundred and fiftieth anniversary, conferred the honorary degree of Doctor of Philosophy on Professor William M. Davis, of Harvard University.

Dr. L. A. Bauer's resignation from the U. S. Coast and Geodetic Survey took effect on September 1. He has accepted the permanent directorship of the department of terrestrial magnetism in the Carnegie Institution of Washington.

La Montagne reports (No. 6, 1906) that the guide Cyprien Savoie and six French porters have been engaged by Dr. Workman and Mrs. Bullock-Workman to accompany them in their next Himalayan explorations. The party left Srinagar about May 18 for the mountains.

Amherst College has conferred its Doctorate of Science on Dr. James Furman Kemp, Professor of Geology in Columbia University.

PROF. DR. GUSTAVE THIRRING was elected on the 26th of September Director of the Communal Statistical Bureau and of the Municipal Library of Budapest, to fill the vacancy left by the death of Dr. Joseph Körösy.

OBITUARY.

COLONEL DE LANNOY DE BISSY.—Col. de Lannoy de Bissy, long chief of the Cartographic Bureau of the French Army and Colonel of the Fifth Regiment of Engineers, died in France in August. In 1875 he began to prepare his map of Africa, to which he gave all the time he could spare from his official duties for fourteen years. The finished map, on a scale of 31.4 statute miles to an inch, is still the largest map of the whole continent. It was based upon the coast surveys of the British and French Hydrographic Offices and the comparatively few astronomically-fixed points in the interior. He consulted nearly 1,800 route maps and all the writings of African explorers that he could obtain, sifting the facts he used with much pains from the vast material he collated. His work involved many puzzling questions, for explorers failed to agree on many things and even on the directions of mountain ranges and rivers. He gave five months to the drawing of a single sheet showing the Gondar province of Abyssinia; and though often he could not decide correctly between the contradictory assertions of explorers, his insight was keen, his judgment was good, and his map was a remarkable product of the African cartography of its day.

GEORGES LESPAGNOL.—Died on May 29, at the age of forty-one. Professor of Geography at the Faculty of Letters, Lyons, France. Since 1892 he had given all his time to geography, and among the earliest contributions that attracted attention to him was a series of three articles entitled "Caractère désertique de l'Australie intérieure," which was published in *Annales de Géographie* for 1898. He organized the Geographical Institute in the Faculty of Letters.

WILLIAM BUCK DWIGHT.—Died at Cottage City, Mass., on Aug. 29, aged 73 years. He was Professor of Geology at Vassar College for nearly thirty years, and carried on extensive field work in geology, chiefly in Dutchess Co., N. Y. He was one of the original Fellows of the Geological Society of America.

NEW MAPS.

AFRICA.

EGYPT.—Topographical Map of Giza Province. Scale, 1:10,000, or 0.1 statute mile to an inch. Issued in 1905—sheets N.E. 1–3, 1–4, 2–4, 3–3, 3–5, 4–3; S.E. 1–4. Issued in 1906—sheets N.E. 2–2, 2–3, 3–1, 3–2, 3–4, 4–1, 4–2, 4–4, 4–5, 5–1, 5–2; sheets N.W. 5–1, 6–2, 7–2, 7–3, 8–3, 8–4; sheet S.E. 1–3. Survey Department Egypt, Cairo, 1905–6.

Revised sheets of the survey of this Province which was made originally on this scale in 1898–1900.

CAPE OF GOOD HOPE.—Geological Map of the Colony of the Cape of Good Hope (sheet 1). Scale, 1:300,000, or 4.7 statute miles to an inch. The Geological Commission, Cape Town, 1906.

The Geological Commission was appointed in 1895 by the Cape Government for the purpose of organizing a geological survey of the Colony. The Survey began work in 1896, and, though its work is still far from being complete, sufficient information has been collected to decide many disputed points concerning the fundamental structure of the country. Large areas in the colony, including the whole of the country north of the Orange River and immense tracts in the northwestern, midland, and eastern districts, have not yet been surveyed. The work has been completed in the southwestern part of the colony, and the present sheet is the result of the surveys in the Cape Town Region. Ten tints are used to show the rock formations. The superficial deposits are in white.

CANARY ISLANDS.—(1) Skizze einer Höhenschichtenkarte des südlichen Teiles von Palma. (2) Kartenskizze von Lanzarote. Scale, 1:150,000, or 2.38 statute miles to an inch. By Karl Sapper. *Petermanns Mitteilungen*, Vol. 52, No. 7, Gotha, 1906.

These finely-produced maps are the result of Professor Sapper's geographical work on two islands of the Canary group during little more than a month in 1905. The maps are based upon earlier surveys, upon which Professor Sapper has applied contours showing his own determination of heights above sea-level. The contour intervals are distinguished by different tints. The sheet also contains a sketch map of the Montaña de Fuego on a scale of 0.7 statute mile to an inch, with contour interval of 20 meters. These maps, with the accompanying letterpress, are an example of the good geographical work which a trained geographer may accomplish in a summer vacation.